APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/605,289	06/28/2000	Pamela R. Lipson	TER-008PUS	5923

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EXAMINER
CHAWAN, SHEELA C

ART UNIT	PAPER NUMBER
2625	

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _16 July 2003_ .

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-28 and 45-48_ is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-11,16,17,19-21 and 45_ is/are rejected.

7)☒ Claim(s) _12-15,18,22-28 and 46-48_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _01 October 2001_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

   If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____ .

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
       application from the International Bureau (PCT Rule 17.2(a)).
   * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

   a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)   4)☐ Interview Summary (PTO-413) Paper No(s). _____ .

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5)☐ Notice of Informal Patent Application (PTO-152)

3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .   6)☐ Other: .

DETAILED ACTION

Response to Amendment

1.   Applicant's arguments filed on July 16, 2003 (paper # 6/A) have been fully

considered but they are not deemed to be persuasive.

Drawings

2.   The drawings filed on this 10/1/01 have been approved by draftsperson's .

Claim Objections

3.   Claim 1 is objected to because of the following informalities:

Claim 1 line 6 delete one and .

Claim 1, line 9 change - - objct - - , to - - object - - ;

claim 1, line 11 change - - determinig - - , to - - determining - - ;

claim 1, line 12 change - - determinig - - , to - - determining - - ;

Appropriate correction is required.

Allowable Subject Matter

4.   Claims 12-15, 18, 22-28, 46-48, are objected to as being dependent upon a

rejected base claim, but would be allowable if rewritten in independent form including all

of the limitations of the base claim and any intervening claims.

Regarding claim 12, the prior art fails, to teach wherein said inspection module

comprises:

a learn model processor for learning and saving attribute, about the appearance

of parts and for generating image, structural and geometric models from data gathered

and

wherein said inspection module is adapted to-update one or more of

predetermined image, structural and geometric models with models generated by said

learn model processor. .

Regarding claim 15, since these claim depend upon claim 12, they are also

objected for the same reason .

Regarding claim 13, the prior art fails, to teach wherein said inspection module

comprises:

a background model processor for learning and saving attributes about the

appearance of parts and for generating image, structural and geometric models from

data gathered during an inspection process; and

wherein said inspection module is adapted to dynamically update one or more of

predetermined image, structural and geometric models with models generated by said

background model processor.

Regarding claim 14, since these claim depend upon claim 13, they are also

objected for the same reason .

Regarding claim 18, the prior art fails, to teach the step of:

(c) applying a third model to the region of interest around the object .

Regarding claims 22- 25, since these claim depend upon claim 18, they are also

objected for the same reason .

Regarding claim 26, the prior art fails, to teach the steps of

(d) prior to applying the first model, annotating a package library;

(e) generating an inspection plan;

(f) implementing a learning process;

(G) applying the first model to a test data set; and

(h) applying the second model to the test data set.

Regarding claims 27 and 28, since these claim depend upon claim 26, they are

also objected for the same reason .

Regarding claim 46, the prior art fails to teach said learn model processor

provides , structural and geometric models by updating existing structural and geometric

models with attributes generated by said learn model processor.

Regarding claims 47- 48, since these claim dependent upon claim 46, they are

also objected for the same reason.

Claim Rejections - 35 U.S.C. § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
>
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
>
> the prior art are such that the subject matter as a whole would have been obvious at the time the
>
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
>
> Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1- 11, 16, 17, 19-21, 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Dell et al. (US.6,324,298), in view of Engel et al. (US.5,371,690).

As per claims 1 and 45, O'Dell teaches an inspection system comprising:

(a) a database having stored therein a package library (the package library includes information regarding the object such as size of the object , die fig 3, item A2 , define the product geometry , fig 3, item A3, die pitch , database fig 2, item E, column 5, lines 25- 29, column 11, lines 55- 62);

(c) an image processing system including an image capture processor (column 10, lines 30 - 35) , an image processor and (column 5, lines 1-4, column 7, lines 3- 46) ; and

(d) an inspection module, coupled to said image processing system, said inspection module including (column 5, lines 1-4, column 7, lines 3- 46) :

an image model processor (column 4, lines 27- 30) determining a presence of an object within a region of interest (fig 1, camera 20 , column 7, lines 8-10);

a structural model processor (column 7, lines 3- 22) determining structural

features of the object (fig 1, parameter input device 22, fig 2, step A2) ; and

a geometric model processor (geometric model is defined as wafer having rough

location and rotation data provided by the previous two model and it determines a

precise location of the part on object by inspecting , column 4, lines 50 -59, column 7,

lines 3-22) determining a precise location of the object (fig1, wafer alignment device

16, fig 2, step A 2) .

Regarding claims 1 and 45, O'Dell discloses defect inspection systems for the

semiconductor industry it relates to automated inspection equipment, systems and

processes. Specifically, the present invention is an automated method of inspecting a

semiconductor wafer in any form including whole patterned wafers, sawn wafers,

broken wafers, partial wafers, and wafers of any kind on film frames, dies, die in gel

paks, die in waffle paks, multi-chip modules often called MCMs, JEDEC trays, Auer

boats, and other wafer and die package configurations for defects, the method

comprising (1) training a model as to parameters of a good wafer via optical viewing of

multiple known good wafers, and (2) inspecting unknown quality wafers using the

model. However, O'Dell do not explicitly discloses an inspection plan generator

coupled to receive information from said database and for generating an inspection

plan. However, Engel discloses a method and apparatus for inspection of surface

mounted devices .In further accord with this aspect of the invention, the apparatus

includes a video input for generating an image of at least a portion of the component

being inspected. An inspection element, coupled with that video input, estimates the

component position by inspecting successive features in accord with the plan developed by the planning element. An output signal, generated by the inspection element, provides that estimation, for example, to placement equipment , which can make final adjustments in placement. The system comprises of : an inspection plan generator coupled to receive information from said database and for generating an inspection plan (abstract, column 2, lines 25- 41, column 6, lines 6- 68), as shown by Engel the use of inspection plan generator coupled to receive information from said database and for generating an inspection plan, because this will include a planning element for devising a plan for inspecting features of the surface mounted device to determine their characteristics and, from them, to estimate a position of the device itself. That plan, more specifically, is intended to reduce with inspection of each successive feature any uncertainty in the estimation of the position of the component (column 2, lines 25- 31) .

Therefore, it would have been obvious to one with ordinary skill in the art at the time of invention to incorporate the teaching as taught by Engel 's into the system of O'Dell, because, one with ordinary skill in the art would realize that this planning element for devising a plan for inspecting features of the surface mounted device to determine their characteristics and, from them, to estimate a position of the device itself. That plan, more specifically, is intended to reduce with inspection of each successive feature any uncertainty in the estimation of the position of the component, as suggested by Engel at (column 2, lines 25- 31) .

As per claim 2, O'Dell teaches the system of Claim 1 wherein said image model processor comprises:

an image model (column 4, lines 27- 30) ; and

means for applying the image model to an image of an object being inspected to determine if the part being inspected looks like parts that have been seen in the past (column 7, lines 5- 46) .

As per claim 3, O'Dell teaches the system of Claim 2 wherein the at least one attribute corresponds to one of color or luminance (column 10, lines 1- 15, column 19, lines 34- 55).

As per claim 4, O'Dell teaches the system of Claim 3 wherein said image model comprises at least one attribute arranged in a fixed spatial manner (column 7, lines 5- 8) .

As per claim 5, O'Dell teaches the system of Claim 1 wherein said structural model processor comprises;

a structural model (column 4, lines 60- 63); and

means for applying said structural model to an image of an object being inspected to determine whether a part exists in the image that has tile same structure as that encoded in said structural model (column 7, lines 23- 46).

As per claim 6, O'Dell teaches the system of Claim 5 wherein said structural model comprises

a set of regions (column 17, lines 39-53); and

a set of relations between predetermined ones of the set of regions (column 17, lines 39- 63) .

As per claim 7, O'Dell teaches the system of Claim 6 wherein a set of relations included in the structural model includes relative color relations between predetermined regions of the structural model (column 10, lines 1- 15, column 19, lines 34- 55).

As per claim 8, O'Dell discloses defect inspection systems for the semiconductor industry it relates to automated inspection equipment, systems and processes. O'Dell is silent about applying the geometric model to an image of an object being inspected to determine part placement details. However, Engel discloses a system wherein said geometric model processor comprises:

a geometric model (column 12, lines 48- 55) ; and

means for applying the geometric model to an image of an object being inspected to determine part placement details (column 12, lines 48- 68, column 13, lines 24- 43, column 7, lines 12- 35) .

As per claim 9, Engel teaches the system of Claim 8 wherein said means for applying the geometric model to an object comprises means for searching for one or more edges or one or more gradient regions of the object with the constraint that the pattern of the one or more gradients match a top level configuration (column 7, lines 1 – 36, column 10, lines 53- 68).

As per claim 10, O'Dell teaches the system of Claim 9 wherein said geometric model utilizes gradients in at least one of luminance or color to precisely locate the object being inspected (column 10, lines 1- 15, column 19, lines 34- 55).

As per claim 11, Engel teaches the system of Claim 9 wherein said means for searching includes means for simultaneously searching for one or more edges or one or more gradient regions of the object (column 4, lines 48- 57, column 3, lines 18) .

As per claim 16, O'Dell teaches the system of Claim 1 further comprising a theta estimator for reducing the range of angles over which a model is applied (column 19, lines 34- 55).

As per claim 17, O'Dell teaches a method for inspecting an object comprising the steps of:

(a) applying a first model (plurality of known good die, and for mining a model within computer system is considered to be first model, column 19, lines 33- 55, column 20, lines 8- 36) having a first set of attributes to a region of interest around the object (column 7, lines 3- 46, column 12, lines 43- 68, column 13, lines 1 – 12, 36- 48, column 14, lines 5- 36, column 19, lines 33- 55, column 20, lines 8- 36) ; and

(b) applying a second model to the region of interest around the object (plurality of known good die, and for mining a model within computer system is considered to be second model, wherein the second model has a second set of attributes wherein the second set of attributes differs from the first set of attributes by at least one attribute (column 7, lines 3- 46, column 12, lines 43- 68, column 13, lines 1 – 12, 36- 48, column 14, lines 5- 36, column 19, lines 33- 55, column 20, lines 8- 36).

As per claim 19, O'Dell teaches the method of Claim 17 wherein:

the first model corresponds to one of an image model (column 5, lines 5- 10) and a structural model ; and

the second model corresponds to one of a structural model and a geometry model (

column 5, lines 25- 30).

As per claim 20, O'Dell teaches the method of Claim 17 wherein the step of

applying the first model reduces the number of parameters considered by the second

model (column 12, lines 60- 67, column 13, lines 1- 12 ,column 14, lines 51- 57).

As per claim 21, O'Dell teaches the method of Claim 20 wherein the parameters

are rotation and translation of the object (column 9, lines 38- 57) .

Remarks

6.   In the remark, applicants have argued in substance that :

1. O'Dell nor Engel, taken alone or in combination , disclose or suggest an image

model processor which determines a presence of an object within a region of interest , a

structural model processor which determines structural features of the object and a

geometric model processor which determines a precise location of the object .

In the reply , the examiner states the following.

As to point 1, with respect to the art rejection , the examiner has carefully

considered applicant's argument, but firmly belives the cited reference to reasonably

and properly meet the claimed limitation, with respect to applicants argument . The

examiner does not agree with the remarks that O'Dell is relied upon to provide these

features as stated in the rejection . However, applicant is reminded that the claim

language is given its broadest reasonable interpretation and applicant cannot rely upon

the features from the specification brought out in the claims because the specification is

not the measure of the invention but claims are Therefore, O'Dell does teach this

limitation O'Dell , disclose an image model processor which determines a presence of an object within a region of interest (fig 1, camera 20, column 7, lines 8-10 , a structural model processor which determines structural features of the object (fig 1, parameter input device 22, fig 2, step A2) and a geometric model processor which determines a precise location of the object (fig 1, wafer alignment device 16, fig 2, step A2) .

7.   Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for reply expire later than SIX MONTHS from the date of this final action.
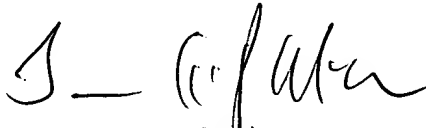
Contact Information

8.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is 703-305- 4876. The examiner can normally be reached on Monday through Thursday 7.30 a.m. to 6.00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached on (703) 308 - 5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9700.

Jayanti K. Patel
Primary Examiner

Sheela Chawan
Patent Examiner
Group Art Unit 2625
Sept 1, 2003